

U.S. Patent Application No. 10/621,096
Amendment dated March 13, 2006
Reply to Office Action of December 12, 2005

REMARKS/ARGUMENTS

Reconsideration and continued examination of the above-identified application are respectfully requested. In the amendment, the independent claims have been amended to recite that the sputtering target assemblies of the present invention have a heat sink configuration on the underneath side of the target assembly. A heat sink configuration improves cooling of the target during the sputtering process. Full support for this amendment can be found in the present application, for instance, at page 9, line 19 to page 10 of the present application. Accordingly, full support for this amendment exists and entry of this amendment is respectfully requested.

Rejection of claims 1, 2, 5, 6, 8-16, 18, 19, 21, 23, and 35 under 35 U.S.C. §102(e) over Segal et al.

At page 2 of the Office Action, claims 1, 2, 5, 6, 8-16, 18, 19, 21, 23, and 35 were rejected under 35 U.S.C. §102(e) over Segal et al. (U.S. Patent No. 6,878,250). The Examiner alleged that Segal et al. teaches a monolithic sputter target assembly having a one-piece assembly with a sputtering target blank portion and a backing plate portion as claimed. For the following reasons, this rejection is respectfully traversed.

With respect to the Examiner's comments concerning Segal et al., the applicants do not fully agree with the Examiner's characterization of Segal et al. with respect to showing a backing plate portion. There is no section in Segal et al. that refers to the existence of a backing plate portion with regard to the sputtering target described in Segal et al. Moreover, there is no teaching or suggestion of a heat sink configuration on the underneath side of the target assembly. The primary portion of Segal et al. relied upon by the Examiner in rejecting the claims is Figure 3A of Segal et al. However, it is clear from Fig. 3A that there is no heat sink configuration on the

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underneath side of the target. Furthermore, there is no teaching or suggestion in the specification of Segal et al. regarding a heat sink configuration. The portions of Segal et al. that describe the formation of a target simply do not refer to the creation of any such configuration. Regarding the description of Fig. 3A, the bottom surface of the target in Segal et al. is cooled by water which if a heat sink configuration was present, one would have to question why this type of set up would be needed for annealing.

Finally, the applicants do not agree with the Examiner's reasoning concerning the differences with the flange portion allegedly shown in Segal et al. as compared to the target surface. For these reasons, this rejection should be withdrawn.

Rejection of claims 37, 38, 40, 41, 42, and 43 under 35 U.S.C. §102(e) over Jepson et al.

At page 5 of the Office Action, claims 37, 38, 40, 41, 42, and 43 were rejected under 35 U.S.C. §102(e) over Jepson et al. (U.S. Published Patent Application No. 2002/0112789). The Examiner alleged that Jepson et al. discloses a monolithic sputtering target assembly comprising a one-piece assembly made from the same metal. For the following reasons, this rejection is respectfully traversed.

With regard to Jepson et al., the applicants respectfully disagree with the Examiner's assertion that Jepson et al. shows a monolithic sputtering target assembly comprising a one-piece assembly made from the same metal. The Examiner refers to the Abstract and Fig. 1 of Jepson et al. and it is quite clear that the abstract and Fig. 1 of Jepson et al. do not teach or suggest a monolithic sputter target assembly. Fig. 1 clearly shows the formation of a plate wherein two circular disks will be cut out which will form a target blank. This is not a monolithic sputter target assembly as described in the claims of the present application. Furthermore, the abstract of

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Jepson et al. does not teach or suggest anywhere the formation of a monolithic sputter target assembly. There is only a discussion of a target. It is respectfully pointed out to the Examiner that the formation of a target or target blank is only one piece of a target assembly. If there is any other portion of Jepson et al. which the Examiner has relied upon to justify the rejection of these claims in showing a monolithic sputter target assembly, the Examiner is respectfully requested to identify such sections since the applicant and the undersigned have been unable to find any location in Jepson et al. which teaches or even suggests a monolithic sputter target assembly. Further, no design or description of a target assembly is shown in Jepson et al. Jepson et al. strictly relates to a circular disk formed from plate which would ultimately be bonded onto a backing plate for forming a target assembly. In addition, there is no description whatsoever of a heat sink configuration in Jepson et al. as recited in the claims.

It is important that the Examiner appreciate that a sputtering target assembly as shown in the present application is a one piece assembly which can serve as a sputtering target and also have the functions of a backing plate meaning no separate backing plate is necessary. This is clearly not the configuration shown in Jepson et al. and there is no teaching or suggestion whatsoever in Jepson et al. to suggest that the target blank of Jepson et al. can serve as a target assembly by itself. Accordingly, for these reasons, this rejection should be withdrawn.

Rejection of claims 3, 22, 25, 27, 28, 32, 34, and 36 under 35 U.S.C. §103(a) over Segal et al. in view of Aimone et al.

At page 7 of the Office Action, claims 3, 22, 25, 27, 28, 32, 34, and 36 were rejected under 35 U.S.C. §103(a) over Segal et al. in view of Aimone et al. (U.S. Published Patent Application No. 2002/0112955). The Examiner took the position that it would have been obvious

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to modify the invention of Segal et al. to use Nb as a sputtering target in order to produce optical, electrical, and magnetic product manufacture, to recycle a sputtering target by filling zones of erosion with metal powder, to recycle the target material by filling cavities of a target, to redeposit a metal powder onto the sputter target to form a new target, to use the metal powder for the target, and to utilize the target derived of ingot metal. The Examiner further alleges that the motivation for recycling a metal target is that it allows for decreasing costs of sputtering targets as taught by Aimone et al. For the following reasons, this rejection is respectfully traversed.

With respect to this rejection, it is pointed out that Aimone et al. does not relate to monolithic sputtering target assemblies. Aimone et al. specifically addresses the issue where the sputtering target is a separate article from the backing plate and even indicates that the advantage of the process is to rejuvenate a target without separating the backing plate. Thus, it is questionable whether this process can be applied to the alleged monolithic target of Segal et al. as alleged by the Examiner. Certainly, the issues will be different when one is dealing with a monolithic target as opposed to a separate target and backing plate. Furthermore, since Aimone et al. does not relate to a monolithic target configuration, clearly, it does not teach the deficiencies mentioned above with respect to Segal et al.

Finally, the Examiner's motivation for recycling the metal target of Segal et al. from the standpoint of decreasing cost of the sputtering targets would not necessarily apply to Segal et al. especially since different assemblies are being used. For these reasons, this rejection should be withdrawn.

Rejection of claims 4 and 24 under 35 U.S.C. §103(a) over Segal et al. in view of Holcomb et al.

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At page 9 of the Office Action, claims 4 and 24 were rejected under 35 U.S.C. §103(a) over Segal et al. in view of Holcomb et al. (U.S. Published Patent Application No. 2002/0134675). The Examiner took the position that it would have been obvious to modify the invention of Segal et al. to use cobalt as the material for the sputtering target because it allows deposition of a cobalt layer on a substrate. For the following reasons, this rejection is respectfully traversed.

The above comments regarding the allowability of amended claims 1 and 19 over Segal et al. apply equally here. Consequently, the combination of Segal et al. and Holcomb et al. does not teach or suggest all of the elements of claims 4 and 24 and the rejection of these claims should be withdrawn.

Rejection of claims 25, 26, and 39 under 35 U.S.C. §103(a) over Segal et al. in view of Lupton et al.

Also at page 9 of the Office Action, claims 25, 26, and 39 were rejected under 35 U.S.C. §103(a) over Segal et al. in view of Lupton et al. (U.S. Published Patent Application No. 2002/0096430). The Examiner took the position that it would have been obvious to modify the invention of Segal et al. to recycle the target and to melt down the spent monolithic target for recycling in order to save the expense of the target material. It is noted that the Examiner failed to treat claim 39 in this rejection. For the following reasons, this rejection is respectfully traversed.

The above comments regarding the patentability of the claims over Segal et al. applies equally here. Lupton et al. does not overcome the deficiencies pointed out above. Furthermore, Lupton et al. relates to a hollow cylindrical cathode sputtering target with a target holder and

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therefore does not relate to a monolithic target assembly. Furthermore, the shape and design are quite different from the shape and design of Segal et al. Therefore, it would be difficult to combine these technologies together. According, for these reasons, this rejection should be withdrawn as well.

Rejection of claim 39 under 35 U.S.C. §103(a) over Segal et al. in view of Aimone et al. and further in view of Lupton et al.

At page 10 of the Office Action, claim 39 was rejected under 35 U.S.C. §103(a) over Segal et al. in view of Aimone et al. and further in view of Lupton et al. The Examiner took the position that it would have been obvious to modify the invention of Segal et al. based on Aimone et al. to recycle the target as taught by Lupton et al. For the following reasons, this rejection is respectfully traversed.

The above comments regarding the allowability of claim 25 apply equally here. Consequently, the combination of Segal et al., Aimone et al., and Lupton et al. does not teach or suggest all of the elements of claim 39 and the rejection of this claim is overcome and should be withdrawn. Furthermore, as pointed out above, Aimone et al. and Lupton et al. do not relate to monolithic target assemblies and therefore the issues involved would be quite different with the alleged monolithic target design of Segal et al. The Examiner is mixing and matching various technologies in an effort to determine the patentability of the claims, which appears to involve an improper exercise of hindsight. For the reasons set forth above and the reasons set forth herein, this rejection should be withdrawn as well.

Rejection of claim 17 under 35 U.S.C. §103(a) over Segal et al. in view of Jepson et al.

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At page 11 of the Office Action, claim 17 was rejected under 35 U.S.C. §103(a) over Segal et al. in view of Jepson et al. The Examiner took the position that it would have been obvious to modify the invention of Segal et al. to have a target where a (100) texture is on the surface or throughout the metal because it allows for improving sputtering performance. For the following reasons, this rejection is respectfully traversed.

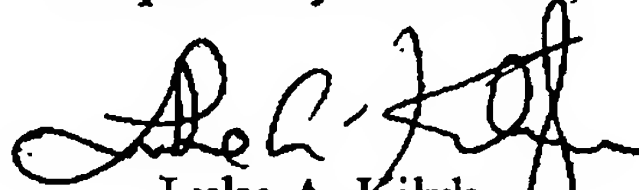
As stated above, Jepson et al. clearly does not relate to a monolithic target assembly. Therefore, the Examiner cannot rely on any part of Jepson et al. to argue that such a target blank would be used to modify the overall alleged target design of Segal et al. Accordingly, for these reasons, this rejection should be withdrawn as well.

CONCLUSION

In view of the foregoing remarks, the applicant respectfully requests the reconsideration of this application and the timely allowance of the pending claims.

If there are any fees due in connection with the filing of this response, please charge the fees to Deposit Account No. 03-0060. If a fee is required for an extension of time under 37 C.F.R. §1.136 not accounted for above, such extension is requested and should also be charged to our Deposit Account.

Respectfully submitted,


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